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ABSTRACT

This study examined teachers' transformations from "sages on the stage to guides on the side" through a survey of preservice secondary school teachers (N=73) over time to identify their envisioned preferred teaching methods; a survey of inservice master teachers (N=24) in professional development schools to identify their choices of teaching methods; and an evaluation of the effectiveness of an educational technology course in changing preservice teachers' envisioned preferred methods. The course in educational technology stressed expansion of preservice teachers' methods beyond lecture and included: (1) diversification of modeled teaching methods; (2) student-centered, projects-based learning; (3) meetings with master school teachers who described and demonstrated effective teaching methods; and (4) preservice teacher design of student-centered interdisciplinary units. The preservice teacher survey found a general trend away from lecture and toward more student self-directed learning and prepackaged instruction. Comparison of ranking of preferred methods before and after the educational technology course indicated students moved lecture from first to third place. Master teachers, however, ranked lecture in fifth place. Attached tables provide detailed analysis of study data. (Contains 11 references.) (ND)

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FROM SAGES TO GUIDES: A PROFESSIONAL DEVELOPMENT STUDY

by

Lauren Cifuentes

Presented at the Annual Meeting of the American Educational Research Association
(New York, NY, April 8-12, 1996)

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From Sages to Guides: A Professional Development Study
A Paper for Presentation at the 1996 AERA Annual Meeting

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This study was designed to examine teachers' transformations from "sages on the stage to guides on the side" (Sizer, 1992). We surveyed preservice teachers over time to identify a trend in envisioned teaching methods; we surveyed inservice master teachers in professional development schools to identify their choices of teaching methods; and we tested the effectiveness of an educational technology course in changing preservice teachers' envisioned choices of methods. To identify the trend in envisioned teaching methods, we investigated changes in inexperienced preservice teachers' choices of teaching methods over two years. We compared the teaching methods employed by inservice master teachers with the methods envisioned by the preservice teachers both before and after implementation of a model for professional development in an educational technology course. The model for professional development employed in the course included four techniques to facilitate expansion of preservice teachers' methods beyond lecture: a) diversification of modeled teaching methods, b) student-centered, projects-based learning, c) meetings with master school teachers who described and demonstrated effective teaching methods, and d) preservice teacher design of student-centered interdisciplinary units. To test the effects of the course on professional development, as it relates to choices of teaching methods, the study compared the methods envisioned by the preservice teachers before and after the course.

Perspective

Currently, many successful educators have relinquished their traditional role as lecturers or disseminators of information and shifted toward newer methodologies such as cooperative learning, portfolio assessment and inquiry learning, all methods that focus on student performance rather than teacher-centered activity such as lecture (Aleman, 1992). The introductory educational technology course for preservice teachers focuses on helping individuals change their visions of themselves as teachers from disseminators of information to facilitators of learning. Technology is central to this transformation. Classroom applications of technology can help teachers create learning environments where students have control over their own work and participate in small group projects (Newman, 1992).

Part of the national educational restructuring process, involves changing the roles of teachers. In fact, restructuring has been defined as creating in education departures from conventional practice that fundamentally change the roles of teachers, administrators, students, and parents working with schools. Teachers become facilitators of learning, rather than dispensers of knowledge (Cohen, 1994; Goals 2000, 1994; Reehm, 1995). Teachers need to allow students to participate in active learning, to discover and create there own solutions to problems. The SCANS Report, *What Work Requires of Schools,* lists interpersonal skills such as working on teams and teaching others as necessary skills for the work place. Also, the ability of

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students to use technology effectively, is required for the changing world. However, pre-service teachers find it difficult to envision themselves as "the guide-on-the-side" when the role that has been modeled to them most of their lives (particularly in their most recent college years) has been teacher as "sage-on-the-stage" (Sizer, 1992). Technologies can help a teacher transform their visions of themselves from the "sage-on-the-stage" to the "guide-on-the-side" (Collins, 1991; Cuban, 1986; Dean, 1994, Reiser & Salisbury, 1991). Therefore, one of the goals of the model for professional development in the educational technology course is to close the gap between what successful teachers do and what preservice teachers plan to do.

Our research questions follow: a) Are preservice teachers' perceptions generally changing as to what their role will be as a teacher? b) Are inservice teachers' methods different from preservice teachers' envisioned methods prior to taking the educational technology course and, if so, how? c) Are inservice teachers' methods different from preservice teachers' envisioned methods after taking the educational technology course and, if so, how? and d) Are preservice teachers' envisioned methods prior to taking the course different from preservice teachers' envisioned methods after taking the educational technology course and, if so, how?

Methodology

Subjects are preservice teachers in an introduction to educational technology course at Texas A&M University and effective master teachers in two professional development schools. All subjects plan to teach or do teach at the secondary level. This is not a random probability sample and therefore generalization of the findings is restricted to the population that bears similarities to subjects surveyed.

For the precourse-postcourse comparison, treatment of preservice teachers is incoporated into the course and includes four techniques to facilitate expansion of preservice teachers' choices of methods beyond lecture:

a) Diversification of teaching methods

Preservice teachers explore a variety of teaching methods through discussion, demonstration, and design of classroom activities. They explore ways that technology can support this diversification by freeing teachers to: a) spend more time with students one-on-one and in small groups, b) implement individualized activities, and c) motivate students to spend more time-on-task.

b) Model of student-centered, projects-based education

Preservice teachers in the course spend the semester working at stations in small groups to complete projects which support interdisciplinary units that will be delivered in the professional development schools and later in their classrooms. Collaboratively they create technology resource lists, small-group multimedia instruction, and small-group interactive instructional videos which they then copy to share with high school and junior high school teachers. They participate as individuals in a computer-mediated discussion on the role of technology in education. In the three hour per week course, students meet for fifty minutes of lecture/discussion and the rest of the time is spent actively generating projects. The learning environment is primarily one in which students collaboratively perform relevant tasks.

c) Preservice teachers meet with school teachers and administrators

To connect to the real world of the classroom, preservice teachers meet via interactive videoconference and e-mail with school sites. The classroom

teachers at those sites provide models for use of technology to facilitate implementation of technology-integrated curriculum in student-centered classrooms. They demonstrate for the preservice teachers how technologies help them create and manage active learning environments. They also show teacher produced and middle school student produced multimedia projects. These inservice teachers describe the positive outcomes of experiential learning. They tell stories about students who engaged in technology experiences and multimedia development. The students were transformed into self-directed learners and mentors for other students. They were motivated by problem solving experiences and project development. Teachers describe how to create opportunities for students to learn experientially. They describe how to make technologies available to students as tools to use for exploration, problem solving, and project development and as support tools for individualized learning.

The administrators at school sites share the technology benchmarking process, the value of technology training, and the staff organizational model necessary to facilitate technology integration and problem solving. They discuss the technological preparation and flexibility that they look for when hiring teachers, and they encourage students to look for innovative leadership when job hunting.

d) Design of student-centered interdisciplinary units

Preservice teachers design student-centered interdisciplinary units composed of six small-group work-stations. Five of the work-stations must be supported by technology. For each work-station, preservice teachers describe the desired outcomes, the media selected, the guidance provided, the process the students go through at the station, and the product of the students' labor. They share their class designs with each other and make copies for those who will teach the same content.

Data Source and Analysis

A "Teaching Methods Survey" was designed to identify the rank order of teaching methods preservice teachers imagine themselves using in their future classrooms and the rank order of teaching methods inservice teachers use in their current classrooms: lecture, demonstration, questioning/tutorial, discussion, student performance, self-directed study, or prepackaged stand-alone instruction. "The Teaching Methods Survey" was administered six times--once to inservice master teachers (n=24), four different semesters to preservice teachers on the first day of class (n=279), and once to preservice teachers on the last day of class (n=73). Each survey was filled out anonymously.

Because of the nature of the data as specified in the methods above, a descriptive analysis of the data was conducted to identify the changes in the response distribution on the scales administered at different times to different subjects. Inservice teachers choices of methods, preservice teachers choices of teaching methods prior to taking the course, and preservice teachers choices of methods after taking the course were identified and described.

To answer the four research questions, comparisons of percentages of methods to be used or currently used in the classroom were made. Inferential statistics were also used keeping in mind that generalizability is questionable without a probability sample. To provide evidence of trends in preservice teachers' choices of methods prior to taking the course a repeated measures ANOVA was conducted. Tukey's test revealed specific differences. T-tests were

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conducted to compare inservice teachers surveys with preservice teachers' precourse and postcourse surveys. To provide evidence of change in preservice teachers as a result of the technology course, a T-test was used to compare precourse and postcourse survey results.

Results

Comparisons of rankings of methods by preservice teachers over 4 semesters indicate a general trend away from lecture and toward more student self-directed learning and prepackaged instruction. Envisioned use of demonstration, questioning/tutorial, discussion, and student performance prior to taking the course remained the same over the 4 semesters (see Table 1). The first administration of the survey revealed methods rankings as follows: lecture, discussion, questioning/tutorial, demonstration, student performance, self-directed study, and prepackaged, stand-alone instruction. Four semesters later rankings had changed in order as follows: discussion, lecture, demonstration, questioning/tutorial, student performance, self-directed study, and prepackaged, stand-alone instruction. Preservice teachers' visions of themselves as predominantly lecturers decreased from the Spring of 1994 to the Spring of 1996 while incorporation of self-directed study and prepackaged, stand-alone instruction increased (see Table 2).

Inservice teachers ranked the methods in the following order: student performance, demonstration, discussion, questioning/tutorial, lecture, prepackaged, stand-alone instruction, and self-directed study. The T-test revealed significant differences between teachers' choices of methods and preservice teachers' choices of methods prior to taking the course. While preservice teachers ranked lecture either first or second, inservice teachers ranked lecture fifth. While preservice teachers ranked student performance fifth, inservice teachers ranked it as their first choice method. Preservice teachers ranked demonstration third, while inservice teachers ranked demonstration second. Inservice teachers value questioning and tutorial as a teaching method more than do preservice teachers (see Table 3).

After taking the educational technology course preservice teachers ranked methods in this order: discussion, demonstration, lecture, questioning/tutorial, student performance, self-directed study, and prepackaged stand-alone instruction. When compared to the inservice teachers' methods, preservice teachers still differ significantly. They plan to use lecture and self-directed study relatively more than inservice teachers and they plan to use student performance relatively less than do inservice teachers (see Table 4). When compared to the preservice teachers' prior to taking the course, rankings differed significantly between intended use of three methods. After the course preservice teachers envisioned using relatively fewer lectures and relatively more self-directed study and prepackaged, stand-alone instruction (see Table 5).

Educational Significance

The findings indicate increased acceptance of methods other than lecture by preservice teachers in general, even prior to the professional development delivered in the educational technology course. Still, prior to and after taking the educational technology course, preservice teachers differ significantly from inservice master teachers in their envisioned choices of teaching methods. Master teachers seldom lecture and frequently have

students engage in performance. Preservice teachers plan to lecture a great deal and to have students engage in self-directed study more than do master teachers.

Such findings indicate the need for more exposure to experienced teachers during teacher training. The trend away from lecture, both over time and through professional development, indicates that preservice teachers can become more like master teachers prior to teaching through exposure to the four elements of professional development described above as well as through other means. The findings also indicate that the educational technology course supported a transformation from disseminator of information to facilitator of learning by helping preservice teachers change their favored methodology away from lecture.

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Table 1
Preservice Teachers' Choices of Methods Prior to Taking the Course: Repeated Measures ANOVA

	Mean (STD)						
Method	**Pst/Sp'94**	**Pst/Fa'94**	**Pst/Sp'95**	**Pst/Sp'96**	**r^2**	**F**	**P-calc**
Lecture	1.000 (0)	2.420 (1.594)	2.322 (1.520)	2.573 (1.987)	0.106	10.92***	.0001
Demonstration	3.866 (1.673)	3.246 (1.769)	3.233 (1.709)	3.280 (1.744)	0.017	1.60	0.189
Questioning/ Tutorial	3.755 (1.334)	3.971 (1.571)	4.200 (1.383)	4.213 (1.482)	0.013	1.29	0.276
Discussion	2.844 (1.313)	2.362 (1.494)	2.266 (1.355)	2.586 (1.525)	0.020	1.93	0.125
Student Performance	4.711 (1.342)	4.710 (1.563)	4.188 (1.483)	4.573 (1.620)	0.021	2.04	0.108
Self-Directed Study	6.244 (1.448)	5.318 (1.460)	5.800 (1.559)	5.480 (2.015)	0.035	3.35**	.01
Prepackaged/ Stand-alone Instruction	6.377 (1.153)	6.405 (1.252)	6.388 (1.388)	5.346 (1.428)	0.111	11.56***	.0001

** $p < .05$
*** $p < .005$

Table 2
Post Hoc Analysis: Tukey Test to Identify Differences Between Preservice Teachers Responses on the Precourse Survey Over Time

	Group Comparison	Lower Confidence	Between Means	Upper Confidence
Lecture	Sp. '96 X Fa. '94	-0.520	0.153	0.826
	Sp. '96 X Sp. '95	-0.380	0.281	0.882
	Sp. '96 X Sp. '94	0.812	1.573	2.334***
	Sp. '95 X Sp. '94	0.585	1.322	2.059***
	Fa. '94 X Sp. '95	-0.547	0.098	0.744
	Fa. '94 X Sp. '94	0.646	1.420	2.193***
Demonstation	Sp. '96 X Fa. '94	-0.711	0.033	0.7787
	Sp. '96 X Sp. '95	-0.651	0.046	0.745
	Sp. '96 X Sp. '94	-1.428	-0.586	0.255
	Sp. '95 X Sp. '94	-1.448	-0.633	0.182
	Fa. '94 X Sp. '95	-0.701	0.013	0.727
	Fa. '94 X Sp. '94	-1.476	-0.620	0.235
Questioning/ Tutorial	Sp. '96 X Fa. '94	-0.383	0.242	0.868
	Sp. '96 X Sp. '95	-0.573	0.013	0.599
	Sp. '96 X Sp. '94	-0.249	0.457	1.165
	Sp. '95 X Sp. '94	-0.240	0.444	1.129
	Fa. '94 X Sp. '95	-0.829	-0.229	0.371
	Fa. '94 X Sp. '94	-0.503	0.215	0.934
Discussion	Sp. '96 X Fa. '94	-0.392	0.224	0.841
	Sp. '96 X Sp. '95	-0.258	0.320	0.898
	Sp. '96 X Sp. '94	-0.955	-0.257	0.440
	Sp. '95 X Sp. '94	-1.253	-0.577	0.097
	Fa. '94 X Sp. '95	-0.496	0.095	0.687
	Fa. '94 X Sp. '94	-1.191	-0.482	0.226
Student Performance	Sp. '96 X Fa. '94	-0.792	-0.136	0.518
	Sp. '96 X Sp. '9	-0.2295	0.384	0.998
	Sp. '96 X Sp. '94	-0.878	-0.1378	0.603
	Sp. '95 X Sp. '94	-1.239	-0.522	0.195
	Fa. '94 X Sp. '95	-0.107	0.521	1.150
	Fa. '94 X Sp. '94	-0.753	-0.001	0.752
Self-Directed Study	Sp. '96 X Fa. '94	-0.553	0.161	0.875
	Sp. '96 X Sp. '95	-0.989	-0.320	0.349
	Sp. '96 X Sp. '94	-1.571	-0.764	0.042
	Sp. '95 X Sp. '94	-0.349	0.320	0.989
	Fa. '94 X Sp. '95	-1.1662	-0.481	0.203
	Fa. '94 X Sp. '94	-1.745	-0.925	-0.105***
Prepackaged/ Stand-Alone Instruction	Sp. '96 X Fa. '94	-1.626	-1.050	-0.492***
	Sp. '96 X Sp. '95	-1.573	-1.042	-0.510***
	Sp. '96 X Sp. '94	-1.672	-1.031	-0.390***
	Sp. '95 X Sp. '94	-0.609	0.011	0.631
	Fa. '94 X Sp. '95	-0.527	0.016	0.560
	Fa. '94 X Sp. '94	-0.623	0.028	0.679

*** $p < .005$

Table 3
Comparisons of Teacher's Choices of Methods with Preservice Teachers' Choices of Methods Prior to Taking the Course

	Mean (STD)				
Method	**Inservice Teachers (n=24)**	**Preservice Teachers (n=279)**	**T**	**DF**	**Prob>T**
Lecture	5.416 (1.639)	2.200 (1.643)	9.218***	27	.0001
Demonstration	2.458 (1.178)	3.351 (1.733)	-2.472**	301	.014
Questioning Tutorial	4.791 (2.206)	4.075 (1.453)	2.209**	301	.027
Discussion	2.708 (.954)	2.469 (1.438)	.797	301	.425
Student Performance	2.291 (1.731)	4.505 (1.528)	-6.06***	26	.0001
Self Directed Study	6.041 (1.921)	5.666 (1.677)	.926	26	.362
Prepackaged Stand-alone Instruction	5.625 (1.929)	6.111 (1.387)	-1.59	301	.112

** $p < .05$
*** $p < .005$

Table 4
Comparisons of Teachers' Choices of Methods with Preservice Teachers' Choices of Methods After Taking the Course

Method	Mean (STD) Inservice Teachers (n=24)	Preservice Teachers (n=73)	T	DF	Prob>T
Lecture	5.4166 (1.639)	3.369 (1.996)	5.014***	47	.0001
Demonstration	2.458 (1.178)	3.178 (1.797)	-1.832	95	.07
Questioning Tutorial	4.791 (2.206)	4.232 (1.568)	1.361	95	.176
Discussion	2.708 (.954)	2.452 (1.598)	.741	95	.460
Student Performance	2.291 (1.731)	4.26 (1.958)	-4.67***	44	.0001
Self Directed Study	6.04 (1.9210)	5.041 (1.836)	2.289**	95	.024
Prepackaged Stand-alone Instruction	5.625 (1.929)	5.712 (1.687)	-0.212	95	.832

** $p < .05$
*** $p < .005$

Table 5
Comparisons of Preservice Teachers' Choices of Methods Prior to Taking the Course with Preservice Teachers' Choices of Methods After Taking the Course

	Mean (STD)				
Method	**Prior to Course (n=279)**	**After Course (n=73)**	**T**	**DF**	**Prob>T**
Lecture	2.200 (1.643)	3.369 (1.996)	-5.16***	350.0	.0000
Demonstration	3.351 (1.733)	3.178 (1.797)	0.738	109	.462
Questioning Tutorial	4.075 (1.453)	4.232 (1.568)	-0.775	106	.439
Discussion	2.469 (1.438)	2.452 (1.598)	.084	104	.932
Student Performance	4.505 (1.528)	4.260 (1.958)	1.146	350	.252
Self Directed-Study	5.666 (1.677)	5.041 (1.836)	2.636**	105.5	.0096
Prepackaged/ Stand-alone Instruction	6.111 (1.387)	5.712 (1.687)	2.085**	350	.037

** $p < .05$
*** $p < .005$

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